

Request for A Second STAC Review of the Chesapeake Bay Program Phase 5 Community Watershed Model

Issue:

The Chesapeake Bay Program has developed a refined simulation of the Chesapeake watershed, called the Chesapeake Bay Phase 5 Community Watershed Model, to better estimate and track nutrient and sediment loads. Initial work on this effort has been guided by a previous STAC review of the Phase 5 model. This is to request the reconvening of the Phase 5 Watershed Model review team to review development of the Phase 5 Model since the first review, and to provide guidance on the application of the Phase 5 Model to management issues in the Chesapeake watershed.

Background:

The six Chesapeake Bay watershed States and the District of Columbia are faced with the challenge of numerous Total Maximum Daily Load (TMDL) models due on deadlines often mandated by court orders and agreements. In addition, TMDLs developed in the Chesapeake watershed must be consistent with the Bay-wide water quality standards of dissolved oxygen, chlorophyll, and water clarity. Currently, the states and DC are developing these TMDL models as single “one-off” models, which is an expensive and time consuming process for the thousands of TMDL models needed for all impaired waters of the watershed. To address these problems, the States of Maryland and Virginia have teamed with the EPA Chesapeake Bay Program Office, USGS, ICPRB, University of Maryland, and others to develop the Chesapeake Bay Phase 5 Community Watershed Model.

Building on several generations of model development, the Phase 5 Model approach is designed to: 1) develop a community model useable by federal, state, and local governments, universities, and consultants, 2) achieve consistency between local, small watershed TMDLs, and regional Chesapeake Bay nutrient and sediment water quality standards, 3) pool the expertise and knowledge of the EPA CBPO, USGS, University of Maryland, CRC, and other watershed modelers 4) provide for a common system of watershed evaluation throughout the Chesapeake watershed at the small watershed scale to the large regional scale, and 5) achieve economies of scale in model development. The Phase 5 Watershed Model is largely completed and final adjustments and documentation will be done by December 2007. Application of the Phase 5 model to CBP management decisions will begin in 2008.

Proposal for a Second STAC Review of the Phase 5 Model:

STAC convened an expert team for an initial review of the Phase 5 model in June 2005. This review was insightful and considered and has helped to guide Phase 5 model development. The review report is attached (Attachment A) as well as the response to the review (Attachment B). As we near completion of Phase 5, we wish to initiate another review of the Phase 5 Community Watershed Model in January 2008. The second review would cover model development to date, and guidance and recommendations for the application of the Phase 5 Community Watershed Model to large-scale regional problems such as the Chesapeake Bay water quality standards, and to smaller scale watershed TMDL issues.

Given the knowledge base and experience developed in the first review, this is to request that STAC consider reconvening the expert team that first reviewed the Phase 5 Model. The original review team was Lawrence Band (University of North Carolina), Kenneth Campbell (University of Florida) Russell Kinerson (EPA), Kenneth Reckhow (Duke University), and Claire Welty (UMBC). In case some of the previous reviewers are unavailable for this review, suggested alternate watershed modeling experts for the Phase 5 review are Richard Alexander (USGS), Chris Duffy (PSU), William Ball (JHU), Alexey Arkady Voinov (AAAS) and Saied Mostaghimi (VA Tech).

We suggest the review take the form of the previous one, which satisfies EPA's suggested peer review process. This includes documenting 1) identification of review team members with full contact information, 2) questions posed to the review team for their consideration, 3) review team recommendations in a written report, and 4) a response to the review team's recommendations.

Timing of the Review

An ideal time for this review would be the 3rd, 4th, or 5th, week in January. This would allow for presentation and approval of the final Phase 5 Watershed Model at the January 2008 Modeling Subcommittee Quarterly Review, would be prior to the Water Quality Steering Committee review for approval of Phase 5 for management application and would occur during the winter semester break. A useful aspect of the previous Phase 5 review was the rapid turnaround of the review report which was available in draft within a week of the review. Taking a similar approach in the second review would be appreciated.

Questions Posed to the Reviewers

Development and application of Phase 5 is highly constrained by court-ordered deadlines available resources, and time. Evaluating a model used for environmental regulatory purposes must be done within the context in which the model will be applied and questions posed to the model review group are framed in this context.

The Phase 5 Watershed Model is intended to be used for regional modeling at tributary or subtributary scales to determine the nutrient and sediment load reductions, or caps, needed to be achieved and maintained in order to satisfy tidal water quality standards. In addition, some CBP partners intend to use the Phase 5 Watershed Model for local TMDLs as well, to harmonize local TMDLs with nutrient and sediment reductions needed to achieve Chesapeake Bay water quality standards.

The following questions are intended as guidance, and by no means intended to constrain the reviewer's range of topics or questions. Four general questions are posed:

Question 1: Is the model structure, dynamics, and calibration sufficient for the management purposes at the regional scale to support Chesapeake water quality management with regard to segmentation, land uses, HSPF modifications, and ancillary software?

Question 2: Is the model structure, dynamics and calibration sufficient for the management purposes at the local watershed scale to support sediment and nutrient

TMDLs with regard to segmentation, land uses, HSPF modifications, and ancillary software?

Question 3: Are the data inputs sufficient to support management decisions with regard to meteorology, nutrient inputs, land use, BMPs, septic systems, point sources, and atmospheric deposition at the regional and local scales? Are the future 2030 climate change estimates of temperature and precipitation sufficient for management decisions?

Question 4: Phase 5 is the latest generation of a model that's been applied in the Chesapeake watershed for more than two decades. To address increasingly complex and local-scale management needs anticipated in the watershed, what should the next generation of the Chesapeake Bay Community Watershed Model look like?